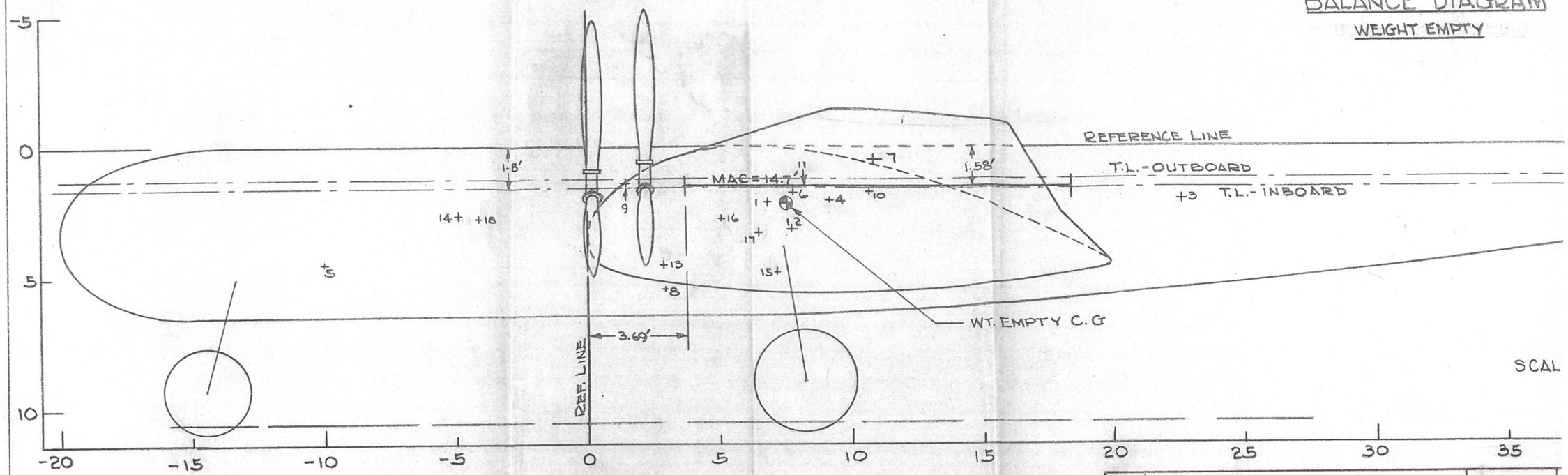
# BALANCE DIAGRAM

## WEIGHT EMPTY




SCAL

| NO. | ITEM | WEIGHT POUNDS |
|---|---|---|
| 1 | WING GROUP (INCL. NOSE CABIN) | 10370 |
| 2 | TAIL GROUP | 650 |
| 3 | FUSELAGE (INCL. 4 GUN TURRETS) | 1340 |
| 4* | LANDING GEAR - MAIN - UP | 3490 |
| 5* | LANDING GEAR - NOSE - UP | 1460 |
| 6* | ENGINES (4 - 1000 H.P. ALLISONS) | 5065 |
| 7* | ENGINE ACCESSORIES | 1440 |
| 8* | ENGINE CONTROLS | 225 |
| 9* | PROPELLERS, GOVERNORS, SHAFTS, & SUPPORTS | 1945 |
| 10* | STARTING SYSTEM | 225 |
| 11* | COOLING SYSTEM | 1480 |
| 12* | OIL SYSTEM | 80 |
| 13* | FUEL SYSTEM | 180 |
| 14* | INSTRUMENTS | 340 |
| 15* | SURFACE CONTROLS | 320 |
| 16* | FURNISHINGS | 1700 |
| 17* | ELECTRICAL SYSTEM | 1045 |
| 18 | RADIO | 610 |
| | WEIGHT EMPTY | 31,965 |

* FOR DETAIL BREAKDOWN, SEE PAGES 8-14

HORIZONTAL C.G.

REFERENCE LINE = L.E.W. (ROOT SECTION)
M.A.C. = 14.7 FT.
L.E. M.A.C. AFT OF REFERENCE LINE = 3.69 FT.

$$C.G. = \frac{7.49 - 3.69}{14.7} = \frac{3.80}{14.7} = 25.9\ \%\ M.A.C.$$

VERTICAL C.G.

REFERENCE LINE = TOP LINE OF FUSELAGE
BELOW REFERENCE LINE = 2.12 FT.
M.A.C. BELOW REFERENCE LINE = 1.58 FT.
C.G. BELOW M.A.C. = 2.12 − 1.58 = 0.54 FT.

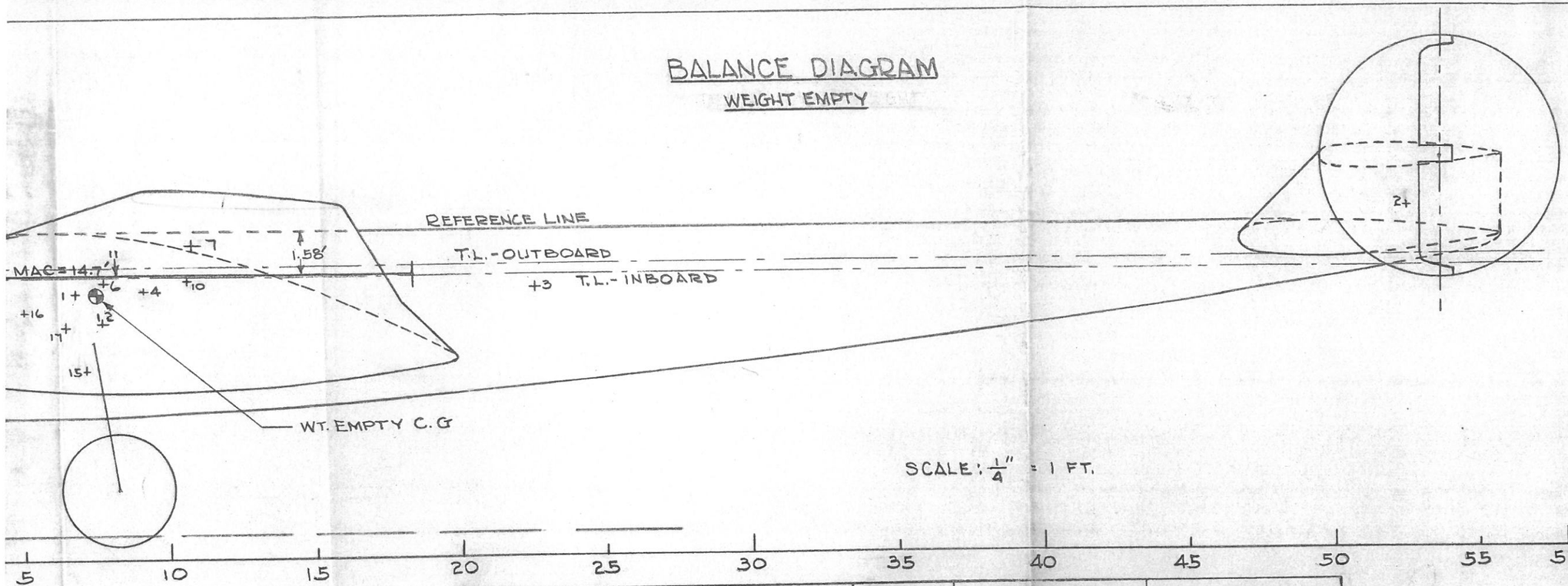
$$C.G.\ \text{IN}\ \%\ M.A.C. = \frac{.54}{14.7} = 3.7\ \%\ M.A.C.$$

TRIM

ZW-LB-001
PAGE NO. 6

# BALANCE DIAGRAM

## WEIGHT EMPTY




| NO. | ITEM | WEIGHT POUNDS | HORIZONTAL ARM | HORIZONTAL MOMENT | VERTICAL ARM | VERTICAL MOMENT |
|---|---|---|---|---|---|---|
| 1 | WING GROUP (INCL. NOSE CABIN) | 10370 | 6.8 | 70516 | 2.1 | 21777 |
| 2 | TAIL GROUP | 650 | 52.5 | 34125 | -.5 | -325 |
| 3 | FUSELAGE (INCL. 4 GUN TURRETS) | 1340 | 22.6 | 30284 | 2.0 | 2680 |
| 4* | LANDING GEAR - MAIN - UP | 3490 | 9.13 | 31870 | 2.03 | 7089 |
| 5* | LANDING GEAR - NOSE - UP | 1460 | -10.37 | -15146 | 4.44 | 6487 |
| 6* | ENGINES (4 - 1000 H.P. ALLISONS) | 5065 | 7.75 | 39254 | 1.75 | 8864 |
| 7* | ENGINE ACCESSORIES | 1440 | 10.89 | 15685 | .45 | 642 |
| 8* | ENGINE CONTROLS | 225 | 2.91 | 655 | 5.4 | 121.5 |
| 9* | PROPELLERS, GOVERNORS, & SUPPORTS, SHAFTS, | 1945 | 1.49 | 2895 | 1.9 | 3696 |
| 10* | STARTING SYSTEM | 225 | 10.6 | 2385 | 1.68 | 379 |
| 11* | COOLING SYSTEM | 1480 | 8.14 | 12048 | 1.44 | 2138 |
| 12* | OIL SYSTEM | 80 | 7.73 | 618 | 3.14 | 251 |
| 13* | FUEL SYSTEM | 180 | 2.86 | 515 | 4.48 | 807 |
| 14* | INSTRUMENTS | 340 | -4.84 | -1645 | 2.60 | 883 |
| 15* | SURFACE CONTROLS | 320 | 7.14 | 2285 | 4.76 | 1524 |
| 16* | FURNISHINGS | 1700 | 5.07 | 8620 | 2.72 | 4630 |
| 17* | ELECTRICAL SYSTEM | 1045 | 6.54 | 6838 | 3.27 | 3412 |
| 18 | RADIO | 610 | -4.1 | -2501 | 2.7 | 1647 |
| | WEIGHT EMPTY | 31,965 | 7.49 | 239301 | 2.12 | 67796 |

* FOR DETAIL BREAKDOWN, SEE PAGES 8-14

MODEL LB38014